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Technical Report

R 112 SUPPLEMENT

SNOW-COMPACTION EQUIPMENT — VIBRATORY FINISHERS

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U. S. NAVAL CIVIL ENGINEERING LABORATORY

Port Hueneme, California

SUPPLEMENT TO TR-112, SNOW-COMPACTION EQUIPMENT — VIBRATORY FINISHERS

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Type B Final Report

by

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ABSTRACT

This supplement identifies the proprietary components used in the shoe-type and rolling-type vibratory finishers and auxiliary equipment described in TR-112. These finishers were used to investigate the feasibility of surface-hardening compacted snow by vibration in the construction of load-bearing areas by the Navy cold-processing techniques.

SHOE-TYPE VIBRATORY FINISHER

The initial design of the shoe-type vibratory finisher was developed in 1954 by the Pettibone-Wood Manufacturing Company, North Hollywood, California, under contract NOy 73253. This design, detailed in the manufacturer's drawings 6425 and 6426, included the following proprietary items:

1. A 300-inch-pound vibrator, Pettibone-Wood assembly 6050.

2. A 5-hp, 1750-rpm, 3-phase, 60-cycle, 220/440-volt standard electric motor with a U. S. Electric Motor's Inc. varidrive: frame 23-254-21, model VEVGH, 4:1 reduction.

3. A manually operated clutch, Rockford LMS-5520 with drive plate LM-526, and driving cup and hub bearing assembly ULM-530-20 bored 1.376.375 inches with a 3/8- x 3/16-inch keyway.

Modifications to the shoe-type finisher by the Laboratory between 1955 and 1957 resulted in the replacement of the varidrive electric motor and manual clutch with a hydraulic motor and flexible coupling. These changes, shown on Y&D drawings 943610 and 943611, resulted in the use of the following proprietary items:

1. A hydraulic motor rated at 7.7 hp at 1800 rpm and 24.4 gpm of hydraulic fluid at 1000 psi, Vickers model M2-334-60-1C.

2. A double roller-chain flexible coupling, Morse model 4016.

3. Two 20-foot lengths of 3/4-inch-diameter low-temperature hydraulic hose, Aeroquip model 1513 industrial hose fitted with a Snap-tite VEC-12F type 3/4-inch quick-disconnect coupler at one end and a 3/4-inch male pipe fitting at the opposite end.

4. One 20-foot length of 1-inch-diameter low-temperature hydraulic hose, Aeroquip model 30302 fitted with a Snap-tite VEC-16F type 1-inch quick-disconnect coupler at one end and a 1-inch male pipe fitting at the opposite end.

ROLLING-TYPE VIBRATORY FINISHER

The roller-type vibratory finisher was developed by the Essick Manufacturing Company, Los Angeles, California. A modified unit was obtained in 1958 under contract NBy-3164. The unit, shown in the manufacturer's drawings 4-D-44, 4-D-45, 4-D-46, 4-M-22, and 4-M-23, includes the following proprietary items:

1. A vibrator roller, Essick Manufacturing Company model VR-72-TEC, including:
    a. A 59-hp (1800-rpm) gasoline engine, Continental Motor Corporation model F-226.
    b. A Vee-belt drive using a matched set of five belts, Gates Rubber Company Vulco V-V drive C-112.
    c. An automatic centrifugal clutch, engaging at 800 rpm.
    d. A hand-operated plate clutch.
2. A remote-reading tachometer, Sun Electric Corporation.

PORTABLE HYDRAULIC POWER-PACK UNIT

The portable hydraulic power-pack unit used to energize the hydraulic motor on the shoe-type finisher was manufactured in 1956 by Vickers, Incorporated, El Segundo, California, under contract NBy-3112. It was designed as a CJO-21226 hydraulic power unit assembly, which consisted of:

1. A Vickers 60-gallon reservoir and cover assembly, complete with engine-to-pump coupling, coupling guard, piping, pump spacers, suction filter, baffle, air-level gage, filler cap, and breather assembly.
2. A Vickers pump V-334-24-1A-11.
3. A Vickers valve FRG-06-28-11.
4. A Vickers subplate FRGM-06-10.
5. A Continental Model F-162, 20-hp, 1400-rpm, 6-volt, liquid-cooled engine complete with starter and generator, water-temperature gage, tachometer, and hour meter.
6. A maintenance manual assembled by Vickers for Continental engine and hydraulic components.

HYDRAULIC POWER TAKE-OFF ON THE NAVY DUAL-RAIL SNOW TRACTOR

The Model D-4 tractor modified with dual rails to a low-ground-pressure snow tractor,* which was used to tow the finisher, is manufactured by the Caterpillar Tractor Company, Peoria, Illinois. It is fitted with a Caterpillar No. 44 hydraulic control for operating a dozer blade.

Two sets of rear hydraulic lines are available for this control; one for direct drive from the pump unit and one for combination drive with the dozer blade. The D-4 snow tractor was fitted with both sets of lines, each of which was modified for use with quick-disconnect couplings. These modifications entailed replacing the tubing through the tractor cab with double-strength black iron pipe and fitting the terminal ends of the pipe with Snap-tite VEN-16F type 1-inch quick-disconnect nipples.

* NCEL Technical Report R-106, Dual-Rail Snow Tracks for the Caterpillar D-4 Tractor, by A. C. Scott and Douglas Taylor.

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